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Little Antietam Creek Watershed Assessment Report

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Acknowledgement

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This project was conducted by the United States Environmental Protection Agency, Region III's (EPA) CAFO Team with technical support from EPA's contractor, Tetra Tech.

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List of Abbreviations

AFO	Animal Feeding Operation
BMP	Best Management Practices
CAFO	Concentrated Animal Feeding Operation
CNMP	Comprehensive Nutrient Management Plan
EPA	United States Environmental Protection Agency, Region III
MAFO	Maryland Animal Feeding Operation
MDE	Maryland Department of the Environment
NMP	Nutrient Management Plan
NPDES	National Pollutant Discharge Elimination System
TMDL	Total Maximum Daily Loading
SCD	Soil Conservation District
SCWQP	Soil Conservation and Water Quality Plan
WCSCD	Washington County Soil Conservation District
WIP	Watershed Implementation Plan
WRP	Watershed Restoration Plan

I. Executive Summary

The United States Environmental Protection Agency, Region III (EPA) visited four farms in the Little Antietam Creek Watershed in an effort to assess how effective the state's agricultural programs are in protecting local waterways from runoff from animal feeding operations (AFOs). This watershed-based AFO assessment looked at 1) on the ground effectiveness of and compliance with state or federal requirements for reducing nitrogen, phosphorus, and sediment, and 2) the implementation of various best management practices (BMPs) relevant to improving water quality at the farm level. Antietam Creek and its tributaries, such as Little Antietam Creek, have been identified as impaired and not meeting water quality standards set by Maryland for sediments, dissolved oxygen, nutrients (phosphorus), and fecal coliform. EPA has approved a Total Maximum Daily Load (TMDL) for each of these pollutants. Antietam Creek is in the Potomac River Basin which drains to the Chesapeake Bay.

Protection of local waterways depends on local farmers implementing BMPs, whether required or voluntary. Maryland has two regulatory programs that impact animal feeding operations, the General Permit for Animal Feeding Operations and the Nutrient Management Program. The BMPs selected for evaluation in this assessment are required under one or both of these state programs. Another program that is relevant to animal feeding operations is Maryland's voluntary Soil Conservation and Water Quality Plan program which assists farmers with controlling erosion and sediment loss and managing runoff from agricultural lands. Maryland also has various programs to provide technical and financial assistance to farmers to enhance environmental stewardship, such as the Maryland Agricultural Water Quality Cost-Share Program and the Maryland Nonpoint Source Program. These programs, along with others, are vital to the success of protecting and restoring local waterways and ultimately the Chesapeake Bay.

EPA pursued a watershed-based approach in order to assess multiple AFOs where many Maryland programs intersect to drive and support BMP implementation on farms in a watershed in need of restoration. This allowed EPA to evaluate how the state programs, tools and resources translate to implementation of on-the-ground practices to protect water quality. Water quality improvements are not solely the result of state actions, but they rely on the individual farmers who ultimately make the decisions on a day-to-day basis to implement these practices, even without technical and financial assistance.

Based on the watershed assessment, EPA found that Maryland's animal agricultural programs are fairly comprehensive and address most environmental resource concerns on dairy farms. The farms in the assessment were small AFOs not covered under Maryland's General Discharge Permit for AFOs General permit. Therefore, Maryland is relying upon its Nutrient Management Program to address water quality concerns for these operations. Maryland can address a wide range of issues through the NMP; however, the NMP does not appear to address feed storage areas and land application in areas with karst geology. Additionally, the Washington County Soil Conservation District has a watershed restoration plan in place to address the environmental resource concerns causing impairment to the local streams by developing Soil Conservation and Water Quality Plans (SCWQPs) and funding best management practices (BMPs) through

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financial assistance of the Maryland Agricultural Water Quality Cost-Share Program and other funding sources.

General observations made during the assessments include the following:

- Maryland's Nutrient Management Program is fairly comprehensive and addresses most environmental resource concerns on dairy farms.
- All four farms were regulated under Maryland's Nutrient Management Program, and all four farms were generally in compliance with Maryland's Nutrient Management Program requirements.
- Overall, the farms were implementing agricultural conservation practices that are effective at reducing nutrient and sediment pollution to surface waters such as animal waste management systems, nutrient management plans, cover crops, and varying degrees of conservation tillage and barnyard runoff controls.
- Although the farms had many agricultural conservation practices in place, each farm had areas that could be improved upon such as:
 - Ensuring NMPs include generation and land application rates for all manure sources.
 - Addressing feed storage areas and potential silage leachate runoff to surface waters.
 - ~~Managing manure in areas with karst geology.~~

The assessments were conducted prior to or just after several new nutrient management requirements went into effect in January 2014. Some of the farms assessed were already in compliance with the new nutrient management regulations, while other farms needed to take steps to meet the new regulatory requirements. It will be important for Maryland to continue to take steps to implement an effective education and outreach strategy to ensure compliance with the new regulations pertaining to nutrient application setbacks and animal exclusion from streams.

II. Background

This watershed assessment is part of the U.S. Environmental Protection Agency's (EPA's) broader activities working with states to strengthen their animal agricultural programs to improve local water quality, and ultimately the restoration and protection efforts of the Chesapeake Bay. EPA has oversight of the National Pollutant Elimination Discharge System (NPDES) Program which regulates concentrated animal feeding operations (CAFOs). EPA also has oversight of the Chesapeake Bay Total Maximum Daily Load (TMDL) which addresses impairments due to excess nitrogen, phosphorus and sediment. The TMDL is supported by state Watershed Implementation Plans (WIPs) that set forth the pollution control measures needed to fully restore the Bay and its tidal rivers for various sectors including agriculture.

Maryland's Phase I and Phase II WIPs promote implementation of both regulatory and voluntary programs that implement a broad suite of agricultural conservation practices to reduce nutrient and sediment loads from agricultural cropland and animal production operations. Key practices include animal waste storage facilities, barnyard runoff controls, cover crops, nutrient management, land retirement, manure incorporation, and soil conservation and water quality plans.

CAFOs are a subset of animal feeding operations (AFOs). Both AFOs and CAFOs fall within the agricultural sector. The agricultural sector also encompasses pastures, cropland, and nurseries. According to the Chesapeake Bay Program Partnership Watershed Model 2013 Progress scenario, agricultural lands account for 22 percent of the watershed, making agriculture one of the largest land uses in the area, second only to forested and open wooded areas (64 percent). The Bay watershed has more than 87,000 farm operations and 6.7 million acres of cropland. Agriculture is the largest single source of nitrogen, phosphorus, and sediment loading to the Bay through applying fertilizers, tilling croplands, and applying animal manure. Agricultural activities are responsible for approximately 44 percent of nitrogen loads delivered to the Bay and about 58 percent of phosphorus and sediment loads delivered to the Bay (Chesapeake Bay Program Watershed Model 2013 Progress scenario).

Of the agricultural nutrient and sediment loadings to the Bay from all Jurisdictions, Maryland's agricultural sector accounts for 16% of the total nitrogen, 16% of the total phosphorus, and 13% of the total sediment delivered to the Bay (Chesapeake Bay Program Watershed Model 2013 Progress scenario). Amongst all the Jurisdiction's agricultural sectors, Maryland's agricultural sector ranks third in nutrient and sediment loadings to the Bay, following Pennsylvania and Virginia. Agriculture is the largest sector in Maryland of nitrogen, phosphorus and sediment loading to the Bay.

EPA has authority to oversee and evaluate state NPDES permit programs to ensure compliance with the Clean Water Act, including whether CAFO regulations are implemented appropriately in the state. That evaluation may include assessments of animal agriculture operations to see whether those facilities may meet the federal regulatory thresholds to qualify as CAFOs. In addition, EPA has authority to determine if AFO operations should be designated as CAFOs due

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to their impact on receiving waters. These AFO reviews are part of EPA's ongoing regulatory oversight activities to ensure compliance with the Clean Water Act and to assess the effectiveness of state programs in addressing agricultural impacts upon receiving waters. Consistent with those regulatory oversight activities, in a May 29, 2013 modification to the EPA-CBF Settlement Agreement, EPA agreed to undertake AFO reviews in four sub-watersheds throughout the Chesapeake Bay basin over the next four years, starting in 2013. The Little Antietam Creek watershed is the first of these four subwatershed assessments. This subwatershed assessment is also being conducted as part of EPA's oversight responsibilities under the Chesapeake Bay TMDL to oversee Maryland's progress towards achieving its animal agriculture WIP commitments to reduce nitrogen, phosphorus, and sediment consistent with the Chesapeake Bay TMDL allocations.

a. Purpose of AFO Watershed Assessments

The purpose of the AFO watershed assessment is to assess compliance of farms with applicable legal requirements for reducing nitrogen, phosphorus, and sediment; document the implementation of agricultural conservation practices by farmers; assess the effectiveness of state programs in addressing water quality impacts; and get a better sense of how well the Maryland Department of the Environment (MDE) and the Maryland Department of Agriculture (MDA) are providing oversight and outreach to these farms. The farm visits provided EPA with insight into what types of programs Maryland is implementing and how informed farmers are of the regulatory requirements. Maryland's animal agricultural programs include, but are not limited to, the Nutrient Management Program, Soil Conservation and Water Quality Plan (SCWQP) Program, and the AFO General Permit Program. The effective implementation of these programs is the main focus for this assessment.

CAFOs are regulated by MDE and are also subject to the Nutrient Management Program that is administered by the MDA. An AFO with 700 or more mature dairy cows or 1,000 or more cattle (including heifers) is considered a Large CAFO and needs an NPDES CAFO permit if it discharges manure, litter, or process wastewater. An AFO with 200-699 mature dairy cows or 300-999 cattle (including heifers) is considered a Medium CAFO and needs a CAFO permit if it discharges through a man-made device such as a ditch, swale, or pipe or confined animals have access to surface waters. Under an NPDES CAFO permit, an AFO is required to develop and implement either a comprehensive nutrient management plan (CNMP) or a combination of a nutrient management plan (NMP) and a soil conservation and water quality plan (SCWQP), as well as submit a Nutrient Management Annual Implementation Report (AIR) to MDE each year.

Maryland animal agricultural operations that meet the animal threshold of the CAFO program, but do not meet the discharge requirements are regulated as Maryland Animal Feeding Operations (MAFOs). Under a MAFO permit, an AFO is required to develop and implement an NMP and a conservation plan and submit a Nutrient Management Annual Implementation Report (AIR) to MDE each year.

Maryland regulations also require all farmers grossing \$2,500 a year or more or livestock producers with 8,000 pounds or more of live animal weight to develop and implement an NMP. The NMP must be developed by an MDA-certified consultant or farmer and specifies how much manure and other fertilizer can be safely applied to crops. Maryland revised its nutrient

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management regulations in October, 2012, and certain stream protection practices became effective in January 2014. They include requirements such as setbacks for nutrient application and livestock exclusion measures. A summary of the new nutrient management regulations and timeframes for implementation are listed in **Appendix A**.

Maryland's SCWQP Program is a voluntary program to assist farmers with controlling soil erosion from agricultural lands. At the request of a farmer, a Soil Conservation District, MDA, or USDA professional works with the farmer to develop a SCWQP. An SCWQP is "a comprehensive plan that addresses natural resource management on agricultural lands and utilizes BMPs that control erosion and sediment loss and manage runoff."¹ The BMPs include, but are not limited to: crop rotations, tillage practices, cover crops, grass waterways, terraces, diversions, sediment basins, drop structures, and other grade stabilization structures. Conservation practices such as forestry management, wildlife habitat and planting, and ponds construction and management may also be included. Furthermore, the Nutrient Management Program allows farmers to meet their regulatory requirements for both livestock exclusion, and incorporation and/or injection requirements through alternative practices that are identified in an SCWQP.

Maryland's Nonpoint Source Program uses funding from EPA's Clean Water Act Section 319(h) Grant Program to support the state nonpoint source management program and provide grants for state and local projects that help eliminate water quality impairments caused by nonpoint sources, including agricultural sources. A prerequisite for §319(h) funding of implementation projects (i.e. any project involving on-the-ground construction) is EPA's acceptance of a watershed restoration plan.² Maryland's WIP summarizes other programs available to Maryland farmers that provide financial assistance for BMPs implementation and manure transport. Whether a farmer is participating in one of these additional programs was not considered as part of this assessment. However, these programs may be able to provide financial resources to address water quality concerns that were found as part of this assessment. State programs include: Maryland Agricultural Water Quality Cost-Share (MACS) Program, Cover Crop Program, Manure Transport Program (MTP) Program, and Low Interest Loans for Agricultural Conservation (LILAC) Program. The MACS and MTP programs include reviews to ensure BMPs are implemented. Examples of federal programs administered through USDA include: Environmental Quality Incentives Program (EQIP), Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP), Conservation Stewardship Program (CSP), and the Wetland Reserve Program (WRP).

b. Watershed and AFO Selection Process

In the Chesapeake Bay watershed, there are several geographic areas that have large numbers of livestock operations. EPA decided to focus primarily on dairies and cattle for the four AFO subwatershed assessments. Dairies and cattle were selected since most dairy and cattle

¹ [HYPERLINK "http://mda.maryland.gov/resource_conservation/pages/scwqpi.aspx"]

² [HYPERLINK "<http://www.mde.state.md.us/programs/Water/319NonPointSource/Pages/Programs/WaterPrograms/319nps/factsheet.aspx>"]

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operations in the Chesapeake Bay watershed are not subject to permitting under the federal NPDES CAFO program due to size and design. The geographic areas with the largest numbers of dairy cattle are southern New York, south-central Pennsylvania, western Maryland, and the Shenandoah Valley.

In 2013, EPA chose to conduct the AFO watershed review in western Maryland. In Maryland, the counties with the largest numbers of dairy cows are Frederick County (104 farms and 15,726 milk cows) and Washington County (143 farms and 12,672 milk cows) (USDA 2012 Ag Census). Together, these two counties account for approximately 43% of the dairy farms and approximately 56% of the dairy cows in Maryland (USDA 2012 Ag Census). Therefore, EPA decided to select a watershed in one of these two counties.

EPA identified all 12-digit HUC watersheds in Washington County and Frederick County. Starting with this list of 58 watersheds, EPA identified those watersheds that had at least 4 AFOs, whose surface waters were identified as impaired on Maryland's 303(d) list with a TMDL developed, with a headwater stream, and located entirely in Maryland. These criteria narrowed the list of potential watersheds to nine. Of those nine watersheds, EPA identified those watersheds whose surface waters were impaired for sediment, fecal bacteria, and nutrients and were listed as a "priority agriculture watersheds" by USDA for funding through the Chesapeake Bay Watershed Initiative.

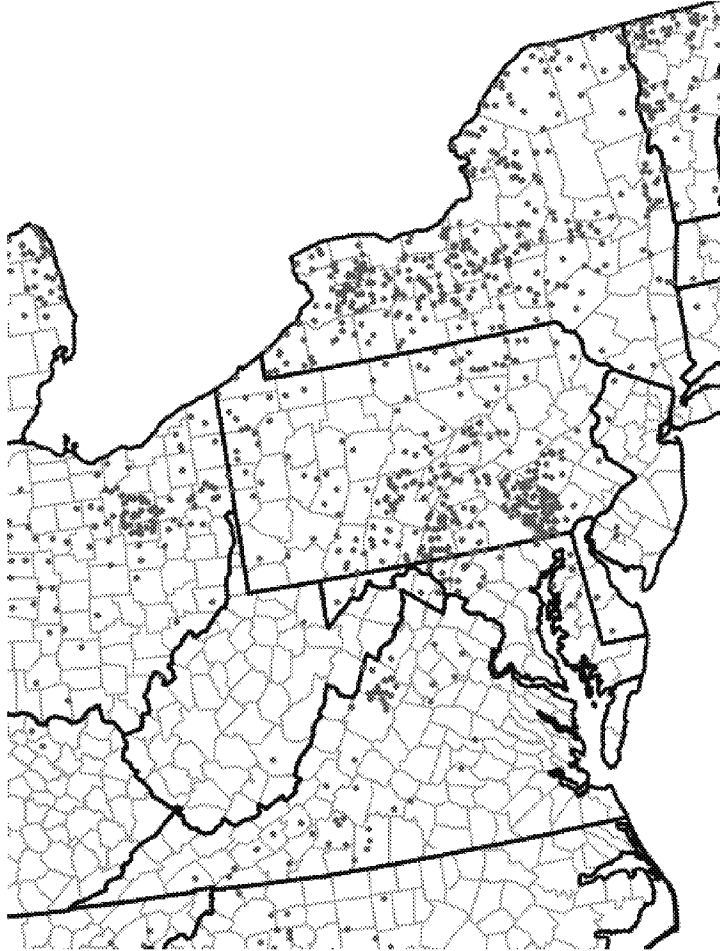


Figure 1: Milk cow inventories, 2012 (1 dot = 2,000 cows). Source: USDA2012 Ag Census

Little Antietam Creek was chosen for the assessment due to having a number of AFOs located close to surface waters with the potential for having a water quality-related impact. All of the AFOs in the watershed appeared to be dairy, heifer, or cattle operations; no poultry or swine farms were identified in the watershed. EPA selected individual AFOs to assess that were located near streams or other surface waters. EPA focused on these AFOs because, due to their location, they may have a larger impact on water quality than farms farther away.

III. Antietam Creek and Little Antietam Creek Watersheds

The Antietam Creek Watershed includes several subwatersheds, including Little Antietam Creek, Beaver Creek, and Marsh Run. The Antietam Creek watershed covers approximately 290 square miles, and Antietam Creek itself is approximately 54 miles in length. Antietam Creek starts in Franklin County and Adams County, Pennsylvania and flows south into Washington County, Maryland. The Antietam Creek watershed includes approximately 105 square miles in Pennsylvania and 185 square miles in Maryland. Antietam Creek eventually empties into the Potomac River along the Maryland-Virginia border. Approximately 42% of the Antietam Creek watershed is in agriculture consisting of cropland, pasture, animal feeding operations, hay, high till and low till farming, and nurseries, with the primary animal based agricultural enterprise being dairies.³

Antietam Creek and its tributaries have been identified as impaired and not meeting water quality standards set by Maryland. The Antietam Creek watershed was listed on Maryland's 1996 303(d) list as impaired for sediments, dissolved oxygen, and nutrients. EPA approved a TMDL for biological oxygen demand (BOD) on August 23, 2002, a TMDL for sediment on December 18, 2008, and a TMDL for nutrients (phosphorus) on September 25, 2013. The Antietam Creek Watershed was also listed on Maryland's 2002 303(d) list as impaired for fecal coliform bacteria, and EPA approved a TMDL for fecal bacteria on October 8, 2009.

The Little Antietam Creek Watershed (HUC-12 Code: 020700041004) is located entirely in Maryland east of Hagerstown, Maryland in northeast Washington County, Maryland along its border with Frederick County, Maryland. Little Antietam Creek is approximately 10 miles long, with the Little Antietam Creek Watershed covering approximately 25 square miles. Little Antietam Creek has one named tributary, Grove Creek, and several unnamed tributaries. Little Antietam Creek and its tributaries generally flow from east to west, starting in the mountains in South Mountain State Park and flowing west toward Antietam Creek.

Land use in the Little Antietam Creek Watershed is dominated by agriculture and forests (see Table 1). Approximately 57.5% of land in the watershed is involved in agriculture, including 9.8% of land in orchards. Approximately 39.2% of the watershed remains in forest, with the majority located in the South Mountain State Park located in the eastern part of the watershed. The Appalachian Trail passes through South Mountain State Park and the Little Antietam Creek Watershed. Only 3.0% of land area is urban, mostly in the southern part of the watershed near Smithsburg, Maryland.

Table 1: Land use in the Little Antietam Creek watershed.⁴

Land Use (Type)	Land Use (Percent)
Cropland	41.6%

³ [HYPERLINK

"http://www.mde.state.md.us/programs/Water/319NonPointSource/Documents/Watershed%20Plans/Antietam%20Creek%20Plan/AntietamCreek_9.17.12_No_Appendices%5bMDE%5d.pdf"]

⁴ [HYPERLINK "http://www.epa.gov/reg3wapd/pdf/pdf_nps/success/md/antietamcreek.pdf"]

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Pasture	6.1%
Orchard	9.8%
Forest/Recreation	39.2%
Urban	3.0%
Industrial/Other	0.3%

With 319h funds, the Washington County Soil Conservation District developed a watershed plan entitled “Antietam Creek Watershed Restoration Plan” (the “Plan”) dated September 17, 2012. The Plan addresses reductions needed to meet the local sediment and fecal bacteria TMDLs. The Plan does not address reductions needed to meet the local phosphorus TMDL that was developed for the Antietam Creek watershed and approved by EPA on September 25, 2013. Watersheds identified in the Plan to be given priority for sediment and fecal bacteria reductions include the subwatershed Antietam Creek at Marsh Run (ANT0277) which encompasses Little Antietam Creek Watershed near Smithsburg, Maryland. In addition to providing funding for development of the Plan, EPA assisted in funding technical staff to provide design and installation assistance for implementation of non-point source projects, including agricultural conservation practices, throughout the entire Antietam Creek Watershed (see **Appendix B**). Agricultural staff focus on implementation of agricultural conservation practices. In total, approximately \$855,000 in 319h funds was committed to the Antietam Creek watershed to support technical agricultural staff between 2003 and 2013. The Washington County Conservation District continues to fund and implement projects to improve water quality in the Little Antietam Creek Watershed.

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IV. Collaboration with State and Local Partners

Both MDE and MDA provided valuable support for EPA's watershed assessment. MDE and MDA helped coordinate the farm visits and provided guidance while at each farm about how Maryland's state requirements apply to that particular farm. MDE and MDA also provided compliance assistance to the farmers while on site about things that the farmers could do to help improve their operations.

In addition to MDE and MDA, the Washington County Soil Conservation District also assisted EPA during the farm visits, given its familiarity and relationships with the local farms and farmers throughout Washington County, Maryland.

V. Findings

For this AFO assessment, EPA collected information from on-site visits to four AFO farms within Little Antietam Creek Watershed and public documents pertaining to the impairment and restoration plans inclusive of the Little Antietam Creek Watershed.

Between December 13, 2013 and January 9, 2014, EPA visited four dairy farms in the Little Antietam Creek Watershed. The farm visits were scheduled with the owners in advance. A check list was utilized to ensure that similar information was collected at each of the farms. This information was used to determine whether farms were in compliance with applicable legal requirements related to nitrogen, phosphorus, and sediment. A sample AFO farm visit checklist is included in **Appendix C**.

The following are the major findings from this assessment:

Finding #1: All four farms were regulated under Maryland's Nutrient Management Program.

Finding #2: All four farms were found to be meeting many of Maryland's Nutrient Management Program requirements, including some of the newer requirements of Maryland's Manure Management Manual that went into effect in January 2014.

Finding #3: The Nutrient Management Program appears to be comprehensive in addressing the areas of an operation where manure is generated, stored and land-applied, but does not appear to address feed storage areas and land application in areas with karst geology which can be a potential water quality concern.

Commented [A3]: Addressed in regs

Commented [ZM4R3]: Thank you, the report has been updated to address this.

Finding #4: The Washington County Soil Conservation District's implementation of the watershed restoration plan is helping to provide funding and assistance to farmers to implement key agricultural conservation practices that will help address water quality concerns.

Finding #5: Nutrient Management Plans and Soil Conservation and Water Quality Plans are good planning tools provided they are periodically updated. State and local coordination is important to ensure quality plans, maximize limited resources, and effectively work with farmers to implement agricultural conservation practices.

The following is a more detailed description of how well the AFOs complied with Maryland programs.

a. Maryland's AFO General Permit program

Requirement: Maryland regulations require that all large and medium AFOs that discharge or propose to discharge to waters of the State must be covered as CAFOs under Maryland's General

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Discharge Permit for AFOs, and all large AFOs that do not discharge or propose to discharge to waters of the State must be covered as MAFOs under Maryland's General Discharge Permit for AFOs.⁵ Large AFOs include farms with 700 or greater dairy cattle or 1,000 or more cattle including heifers. Medium AFOs include farms with between 200 and 699 dairy cattle or between 300 and 999 cattle including heifers. Under certain circumstances, a small AFO may be designated a CAFO by MDE or EPA and be required to obtain coverage under Maryland's General Discharge Permit for AFOs.

Observation: All four farms were small AFOs that were not large enough to require coverage as either a CAFO or a MAFO under Maryland's General Discharge Permit for AFOs. The number of dairy cattle at each farm ranged from 133 to 160 head, with an average of 140 mature dairy cows. The number of cattle including heifers at each farm ranged from 111 to 170 head, with an average of 140 cows (other than mature dairy cows). Average total herd size at each of the four farms was 280 head. Neither EPA nor MDE has designated any small AFOs as CAFOs in Maryland.

b. Maryland's Nutrient Management Program

Requirement: As of 2001, Maryland's Nutrient Management Law requires all farmers grossing \$2,500 a year or more or livestock producers with 8,000 pounds or more of live animal weight to follow an NMP when fertilizing crops and managing animal manure [Md. Code Ann., Agric. §8-803.1; COMAR 15.20.07.03(B)(2) and 15.20.07.04].

Observation: All four farms had 8,000 pounds or more of live animal weight and thus are regulated under Maryland's Nutrient Management Program.

Requirement: As of 2001, Maryland's Nutrient Management Law requires all farmers using chemical fertilizer or animal manure to have and comply with an NMP for nitrogen and phosphorus [Md. Code Ann., Agric. §8-803.1(e) and §8-803.1(f); COMAR 15.20.07.04(A)].

Observation: All four farms had current NMPs at the time of the farm visit. All four NMPs were written after October 15, 2012, meaning the NMPs were to have been developed and implemented in accordance with the May 2012 revised requirements outlined in Maryland's Nutrient Management Manual.

Requirement: As of 2001, Maryland's Nutrient Management Manual requires that all materials that provide crop nutrients (including chemical fertilizer and organic materials such as animal manure) shall be included in, and managed by, an NMP [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(I)(C)].

⁵ COMAR 26.08.04.09N

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Observation: One farm's NMP did not identify fields and application rates for land application of bed pack manure that was generated and being land-applied at the farm.

Requirement: As of 2012, Maryland's Nutrient Management Manual requires that farmers move livestock from one side of the stream to the other only through stream crossings designed to prevent erosion and sediment loss [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(II)(C)]. Maryland's Nutrient Management Manual requires that farmers shall gate crossing areas wider than 12 feet [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(II)(C)].

Observation: One farm did not have any surface waters present. A second farm had surface waters present but did not move livestock from one side of the stream to the other. The two remaining farms were being temporarily managed in a manner that excluded animals from the streams while the farmers were planning improvements. The improvements that are selected and implemented will need to meet both the new setback requirements as well as the existing stream crossing requirements.

Requirement: As of October, 2012, Maryland's Nutrient Management Manual requires that organic nutrient sources (such as animal manure) shall be injected or incorporated as soon as possible but no later than 48 hours after application [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(III)(B)(2) and Section 1(D)(III)(C)(3)(b)(i)]. This requirement does not apply to pastures, hay fields, and highly erodible lands (HELs) [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(III)(B)(3) and Section 1(D)(III)(C)(3)(b)(ii)].

Observation: All four farms incorporate manure to some extent. Two farms appear to meet this requirement appropriately on their fields. A third farm does not normally incorporate manure but did incorporate manure in fall 2013. A fourth farm incorporates manure on some fields, although incorporation may not occur within 48 hours after application. This farmer said he was waiting on the state for clarification about which of his fields were considered "highly erodible lands" (HELs) and exempt from this requirement. The farmer also expressed concern that some fields which may not be HELs because they are flat may not be suitable for injection or incorporation due to heavy concentrated flow from upland areas. While all farms were using injection or incorporation to some extent, compliance with the requirement is dependent on field-specific conditions that were beyond the scope of EPA's review, such as HELs or fields where a current SCWQP prohibits or restricts soil disturbance.

Commented [A5]: MDA regs final 10/12, allowed transition to implement until fall 2013

Commented [ZM6R5]: I think the report is consistent with this, as we are not alleging a violation of the incorporation requirement.

Commented [A7]: This is consistent with MDA regulatory exceptions as referenced by EPA above

Commented [ZM8R7]: Yes, which is why we did not allege any particular violation.

Requirement: As of October 2012, Maryland's Nutrient Management Manual requires that a person applying organic nutrient sources (such as animal manure) in the fall to fallow cropland shall plant a cover crop as soon as possible after application, but no later than November 15 [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(III)(C)(3)(b)(iv)].

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Observation: The four farms planted cover crops on 35% to 100% of crop acreage. EPA was unable to determine how soon cover crops were planted after fall application of manure.

Requirement: As of October 2012, Maryland's Nutrient Management Manual requires that applications required in emergency situations such as imminent overflow of a storage facility shall be managed in consultation with MDA [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(III)(C)(4) and Section 1(D)(III)(D)(3)(e)(vi)].

Observation: One farm had an overflow from the liquid manure storage structure in fall 2013. The farmer immediately called his hauler to pump out some manure and land apply it in order to lower the manure level. It is unclear whether or not the farmer contacted MDA in this situation.

Requirement: As of 2012, Maryland's Nutrient Management Manual prohibits winter application of a chemical fertilizer to cropland [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(III)(D)(2)].

Observation: None of the farms applied chemical fertilizer to cropland in winter.

Requirement: As of October 2012, Maryland's Nutrient Management Manual allows winter application of organic nutrient sources (such as animal manure) to cropland only if the operation has inadequate storage and the storage capacity will be exceeded before March 1, the nutrient source is non-stackable (i.e. moisture content over 60% liquid), and there is no other reasonable option to manage it [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(III)(D)(3)(a)]. Maryland's Nutrient Management Manual prohibits winter application of animal manure if the manure is stackable or adequate storage is available [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(III)(D)(3)(e)(i)].

Commented [A9]: MDA regs define stackable as having less than a certain moisture content-

Commented [ZM10R9]: Let me know if the new language clarifies your concern.

Observation: Three of the four farms do not apply animal manure to cropland in winter. At one of these farms, the liquid manure storage system seemed to have insufficient capacity to make it through the winter season without land applying manure. This farm had not previously land applied manure in the winter, but experienced an overflow last fall. Because this is liquid manure, winter application due to inadequate storage would appear to be allowable under Maryland's Nutrient Management Manual requirements. The fourth farm has land-applied bed pack manure in winter in the past due to inadequate storage capacity. If the moisture content of the bed pack manure is less than 60%, this farm does not appear to be meeting the Maryland's Nutrient Management Manual requirements described above, which prohibit winter application of stackable manure.

Commented [A11]: To determine this , would require moisture content

Commented [ZM12R11]: Let me know if the new language clarifies your concern.

Requirement: As of January 1, 2014, Maryland's Nutrient Management Manual requires 10-foot nutrient application setback from surface waters for pastures and 35-foot nutrient application setback from surface waters for sacrifice lots [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(II)(B)]. Livestock must be excluded from the setback to prevent direct

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deposition of nutrients within the setback, or alternatively, a farmer can work with the soil conservation district and develop and implement a SCWQP that includes BMPs such as stream crossings, alternative watering facilities, or pasture management that are equally protective of water quality and stream health [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(II)(B)].

Observation: One farm did not have any surface waters present. The second farm already had stream fencing and vegetated buffers in place to exclude animals from the stream. Two-thirds of the stream had a vegetated buffer ranging from ~20 feet to ~200 feet, while the remaining one-third of the stream had a vegetated buffer ranging from ~5 feet to ~90 feet. The buffer may need to be increased in a few locations in order to meet the new setback requirement. The third farm did not plan to use the lot where surface waters were present until a fence was installed, with installation planned for spring 2014 per the farm's conservation plan. The fourth farm was not allowing animals in the lot with surface waters present at the time of the inspection and was considering their options to meet the new regulatory requirements. These last two farms needed to develop and implement practices to meet the animal exclusion requirement that became effective on January 1, 2014 in order to use these lots for livestock.

Commented [A13]: If animals are not present, exclusion is not required

Commented [ZM14R13]: Let me know if the new language clarifies your concern.

Requirement: As of January 1, 2014, Maryland's Nutrient Management Manual requires 35-foot nutrient application setbacks for application of crop nutrients using broadcast methods and 10-foot nutrient application setbacks for application of crop nutrients using directed spray application or injection [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(II)(B)].

Observation: All four farms land apply both commercial fertilizer and animal manure, and all four farms appeared to be meeting this requirement already.

Requirement: As of January 1, 2014, Maryland's Nutrient Management Manual requires that farmers move livestock from one side of the stream to the other only through stream crossings designed to prevent erosion and sediment loss [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(II)(C)]. Maryland's Nutrient Management Manual requires that farmers shall gate crossing areas wider than 12 feet [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(II)(C)].

Observation: One farm did not have any surface waters present. A second farm had surface waters present but did not move livestock from one side of the stream to the other. The two remaining farms were being temporarily managed in a manner that excluded animals from the streams while the farmers were planning improvements. The improvements that are selected and implemented will need to meet both the new setback requirements as well as the stream crossing requirements.

Requirement: As of July 1, 2016, Maryland's Nutrient Management Manual prohibits all winter application from all farms except for dairy or livestock operations with less than 50 animal units

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[COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(III)(E)(2)(a)]. Effective February 28, 2020, Maryland's Nutrient Management Manual prohibits all winter application from all farms, including dairy or livestock operations with less than 50 animal units [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(III)(E)(2)(b)]. Maryland's Nutrient Management Manual requires farms to make plans for adequate storage to eliminate the need for a winter application before the deadlines described above [COMAR 15.20.07.02; Nutrient Management Manual Section 1(D)(III)(D)(3)(d)].

Observation: Two farms may need to make management adjustments or upgrade storage capacity to comply with these new requirements. One farm has land applied bed pack manure in winter in the past due to inadequate storage capacity. At another farm, the liquid manure storage system seemed to have insufficient capacity to make it through the winter season without drawing down manure for land application. This farm had not previously land applied manure in the winter, but experienced an overflow last fall.

Requirement: Maryland's Nutrient Management Manual does not appear to have requirements applicable to feed storage areas.

Observation: All four farms had some portion of their feed storage that was exposed to precipitation, including one farm that piped silage leachate to an exercise lot adjacent to surface waters.

Note: In many cases, it was difficult to determine whether or not farmers were meeting the requirements of Maryland's Nutrient Management Manual. Many requirements, such as incorporation, cover crops and setbacks, are based on field-specific conditions while EPA only made general observations about the extent to which farmers were implementing these practices. Other BMPs, such as animal waste storage structures, barnyard runoff controls, and mortality management fall within a general requirement to be managed in a manner not to cause water quality impacts. This made it difficult to determine if the potential runoff from uncovered stockpiles or compost piles and uncollected manure in a barnyard would be from an allowable circumstance or would have warranted correction based on the Manure Management Evaluation Form recommended by MDA's Nutrient Management Program.

c. Antietam Creek Watershed Restoration Plan

i. Background

EPA previously accepted the Antietam Creek Watershed Restoration Plan (the "Plan") dated September 17, 2012.⁶ The goal of the Plan is to identify BMPs that are necessary to meet the Antietam Creek TMDL and to restore water quality in the entire Antietam Creek watershed. The

⁶ [HYPERLINK "http://www.conservaionplace.com/Antietam%20Creek%20Plan_Final%209_17_12.pdf"]

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Plan does not require any particular farm to implement any particular BMP. Rather, the plan serves as a guidance document to provide a roadmap for implementing BMPs by 2017 and 2025 that will meet the TMDL allocations for both the local and Chesapeake Bay TMDLs. The Plan states that “Actions taken as part of this [Plan] are in line with Bay TMDL reduction strategies as well and will serve to meet the TMDLs of both waterbodies.”

Agriculture is one of the sectors that the Plan focuses on for addressing sediment and fecal bacteria reductions. Watersheds identified in the Plan to be given priority for sediment and fecal bacteria reductions include the subwatershed Antietam Creek at Marsh Run (ANT0277), which includes the Little Antietam Creek Watershed.

One of EPA’s goals in conducting the AFO watershed assessment was to observe how well MDE and MDA are providing oversight and outreach to these farms. With the interplay of the local TMDL development and the watershed restoration planning that has occurred for Antietam Creek and Little Antietam Creek, the roles and responsibilities of Washington County Soil Conservation District are also very important to the overall success of the regulatory programs and protection of water quality.

The Plan post-dates the Chesapeake Bay TMDL and therefore incorporates the reductions necessary to achieve the 2017 and 2025 Chesapeake Bay TMDL WIP goals in a phased approach. The Plan outlines the type and implementation level of best management practices (BMPs) to achieve the 2017 and 2025 goals. The Plan includes the following BMPs applicable to agriculture in Table 20:

- Grass buffers;
- Riparian forest buffers;
- Stream protection with fencing (livestock exclusion);
- Stream protection without fencing (livestock exclusion);
- Livestock stream crossings;
- Soil Conservation and Water Quality Plans;
- Runoff Control Systems (loafing lot management)
- Animal Waste Management Systems (Manure Storage)
- Nutrient Management Planning
- Conservation Tillage
- Cover crops
- Retire Highly Erodible Lands

ii. Observations

Some of these BMPs are required under Maryland’s nutrient management program, such as nutrient management planning and livestock exclusion. In addition, some of these BMPs were being voluntarily implemented at the four farms that EPA visited. For example, all four farms were implementing conservation tillage practices on 50% to 100% of crop acreage. In addition, all four farms had barnyard runoff control systems in place to some degree; three of the four farms had gutters and downspouts on farm buildings to divert clean water from barnyards, although some of the gutters need repairs. Finally, one farm had a SCWQP and another farm had an NRCS Conservation Plan.

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The farms visits demonstrated that farmers have done much to implement both required and voluntary BMPs, but additional BMPs are still needed to meet both the local TMDL and Chesapeake Bay TMDL. The farm visits support concerns about the types of activities that contribute to the nonpoint source pollution within the watershed, such as uncontrolled runoff from barnyards, livestock access to streams, and lack of year round vegetation. However, EPA did find that the farms visited were implementing conservation tillage practices whether or not they had a formal Soil and Water Quality Plan. Overall, the type of technical assistance that WCSCD is planning to provide appears to be in line with the needs of the farmers.

WCSCD staff plan to visit all dairies in the Little Antietam Creek watershed between 2012 and 2017. The purposes of these visits is to document non-cost shared BMPs and offer conservation planning and technical and financial assistance for BMP implementation. EPA did learn that some of the BMPs had been installed without assistance from cost-share programs. Two farmers said that they did not participate in cost-share programs. One expressed interest in a continued dialogue with the regulators about meeting the requirements and flexibility in the time to be able to fund the BMPs without cost-sharing programs.

WCSCD is hoping 80% of the farms visited will accept the offer to develop or update SCWQPs. SCWQPs will document BMPs that are needed at a particular farm. Table 2 identifies which of the BMPs recommended by the Plan were observed at the four farms and where BMP implementation could be increased at the four farms visited.

Table 2: Implementation of BMPs that are recommended by the Plan at four farms visited.

Practice	# of farms implementing BMP	Potential to increase BMP implementation at four farms visited
Grass and riparian forest buffers	One farm	Two farms could install buffers when they implement new setback requirements, and the farm that currently has buffers may need to increase the buffer size in some areas to comply with new setback requirements.
Stream protection with or without fencing (livestock exclusion) and Livestock stream crossings	One farm	Two farms could install stream fencing and livestock stream crossings. The first farm has fencing planned for Spring 2014 and will not allow animal access to lot until fencing installed. The second farm has partial fencing and is considering his options. Due to winter conditions, animals were confined and did not have access to the stream at the time of EPA's visits.
Soil Conservation and Water Quality Planning (SCWQP)	One farm had a SCWQP, with one additional farm having an NRCS Conservation Plan	Two farms could develop and implement SCWQPs or Conservation Plans.

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Runoff Control Systems	Two farms	Two farms could install gutters and downspouts on buildings around the barnyard to collect and divert clean water around the barnyard areas.
Animal Waste Management Systems (Manure Storage)	Four farms	Two farms may need to increase manure storage capacity (one for bed pack manure, one for liquid manure) in order to meet future prohibitions on winter application of manure.
Nutrient Management Planning	Four farms	One farm needs to update its NMP to include bedpack manure. All four farms will need to maintain current NMPs.
Conservation Tillage or Continuous No-Till	Four farms	Two farms were implementing conservation tillage at less than 100% and could increase implementation levels.
Cover crops	Four farms	Two farms were implementing cover crops at less than 100% and could increase implementation levels.
Retire Highly Erodible Lands	Unknown	Not evaluated by EPA

The Plan acknowledged that future revisions will be necessary, especially when new TMDLs are approved. For example, the phosphorus TMDL for the Antietam Creek watershed was approved by EPA on September 25, 2013. In order to meet the phosphorus TMDL allocations, the Plan may need to be updated to include additional BMPs to address nutrient reductions beyond those already included to address the sediment and fecal bacteria TMDLs.

The WCSCD has done a good job identifying the type of BMPs that are needed and the general framework of how to fund the needed BMPs. Even prior to developing the watershed Plan for EPA acceptance, WCSCD used EPA funds to support the type of BMPs cited in the Plan. As discussed in Section III, approximately \$855,000 in 319h funds was committed to the Antietam Creek watershed between 2003 and 2013 to support technical staff ~~between 2003 and 2013, as well as additional funds who provided design and installation assistance for implementation of agricultural conservation practices, as well as to support~~ development and implementation of the Plan and other non-agricultural projects (see **Appendix B**). The WCSCD identified additional funding sources to help meet those needs, but there is no discussion as to the reasonable expectations of what might be acquired through those sources.

VI. Conclusions

Maryland's Nutrient Management Program is fairly comprehensive in addressing many potential water quality concerns at dairies, such as requiring the development and implementation of NMPs that address various aspects of nutrient management (e.g. cropland, pasture, livestock confinement areas, etc.), including manure management. The farms visited were generally in compliance with Maryland's Nutrient Management Program requirements and were implementing agricultural conservation practices that reduce nutrient and sediment pollution to surface waters, such as animal waste management systems, nutrient management plans, cover crops, and varying degrees of conservation tillage and barnyard runoff controls. Although the farms had many agricultural conservation practices in place, areas that could be improved upon include ensuring NMPs include all manure sources ~~and~~ address feed storage areas and potential silage leachate runoff to surface waters, ~~and manage manure appropriately in areas with karst geology.~~

Maryland also encourages the development of voluntary SCWQPs to help farmers address natural resource management on agricultural lands and utilize BMPs to control erosion and sediment loss and manage runoff. The Nutrient Management Program allows farmers to meet their regulatory requirements for both livestock exclusion, and incorporation and/or injection requirements through alternative practices that are identified in an SCWQP.

Both NMPs and SCWQPs are good planning tools for farmers provided they are kept up to date and should help protect water quality. State and soil conservation district coordination is important to ensure quality plans, to maximize limited resources, and to effectively work with farmers to implement agricultural conservation practices. For example, MDA is responsible for supporting the development of NMPs, the soil conservation districts are responsible for supporting the development of SCWQPs, and MDE relies on the development and implementation of appropriate NMPs and SCWQPs to meet the requirements of the Maryland AFO General Permit. Both NMPs and SCWQPs can identify various agricultural conservation practices that are being implemented or that need to be implemented. EPA believes that NMPs and SCWQPs are excellent tools for water quality protection and restoration, and EPA encourages the state and local agencies to continue to coordinate their efforts in the development of quality plans.

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Appendix A

MDA's Revised Nutrient Management Regulations Fact Sheet

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Appendix B

**EPA non-point source funding for projects in the Antietam Creek Watershed as
documented in Grants Reporting and Tracking System (GRTS)**

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Project Title	Start date	319h Funds	% to Agriculture technical staff	Outcomes
Antietam Creek Targeted Watershed Project	2003	\$124,859	100%	46 Soil Conservation and Water Quality Plans (2,982 acres) and 152 BMPs, including 1 animal waste storage structure, 2 animal watering facilities, and 4 forested riparian buffer projects with 27.4 acres of tree planting and 5,049 feet of livestock exclusion fencing.
Antietam Creek Targeted Watershed Project	2004	\$135,217	100%	Goal to develop 35 soil conservation and water quality plans (3,000 acres), develop 23 NMPs (3,000 acres), update 30 NMPs (4,000 acres), install 75 BMPs identified in the soil conservation and water quality plans, implement 2 riparian forested buffer projects, install 2 animal waste storage structures, install 5,000 feet of stream fencing to exclude livestock, and install 2 watering troughs to provide an alternative watering source for livestock excluded from streams.
Antietam Creek Targeted Watershed Project	2005	\$119,447	100%	7,903 feet fencing, 127.4 acres stream bank protection, and 1 waste storage facility
MDA Antietam Creek Watershed Project	2007	\$150,471	100%	12,643 acres CNMP, 655 acres conservation tillage, 3,740 acres cover crop, 62.8 acres fencing, 1 acre grassed waterway, 0.1 acre lined waterway, 3,440 acres nutrient management, 1 runoff management system, 2.4 acres tree/shrub establishment, and 5 waste management systems.
MDA Antietam Creek Watershed Project	2008	\$156,544	100%	10,730 acres CNMP, 1,050 acres conservation tillage, 3,278 acres cover crop, 11,661 feet fencing, 0.1 acres grassed waterway, 2.4 acres riparian forest buffer, 4 waste storage facilities, and 4 watering facilities
Washington County Soil Conservation District (SCD) Antietam Creek Watershed Plan	2008	\$29,265	0%	Develop watershed plan for seeking future implementation funding
MDA Antietam Creek Watershed Project	2010	\$168,984	100%	119 CNMPs, 1,851 acres conservation tillage, 3,740 acres cover crops, 6,975 acres fencing, 0.2 acres filter strip, 0.8 acres grassed waterway, 0.1 acres lined waterway, 8 roof runoff management systems, 2 waste storage facilities, and 1

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				watering facility
Washington County Little Antietam Creek Stream Restoration	2012	\$240,000	0%	Restore approximately 600 linear feet of eroded stream banks in the Antietam watershed on the Little Antietam Creek adjacent to Greensburg Road in Smithsburg, Maryland
MDE Targeted Watershed Monitoring of NPS Implementation Progress	2013	\$440,088	0%	Provide assessment services that assist in identifying water quality, living resource and habitat problems, identify pollutant source areas, and prioritize potential restoration sites. Assess effectiveness of restoration activities and efficiencies of BMPs being implemented to address impairments of watersheds on the 303d list of impaired waters. Continued monitoring of the Corsica River Watershed implementation projects.
Washington County SCD Antietam Creek Watershed Restoration Phase 1 - Barr Property	2013	\$148,930	0%	Stabilize severe stream bank erosion on 650 linear feet of Beaver Creek.

Source: [HYPERLINK "<http://iaspub.epa.gov/apex/grts/f?p=110:199:0::NO>"]. Note that most of the projects cover the entire Antietam Creek Watershed, not just the Little Antietam Creek subwatershed.

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Appendix C

Samples AFO farm visit checklist

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MARYLAND AFO ON-SITE ASSESSMENT FORM

Form to be completed by EPA personnel

Biosecurity Measures Implemented in Addition to EPA Protocols: **Yes No**

Measures Taken: _____

Date: _____ Time In: _____ (AM PM) Time Out: _____ (AM PM)

Weather: _____

Photos Taken: *Yes (see Photo Log) No*

Samples Taken: *Yes (see Lab Results) No*

EPA Inspector(s): _____

Contractor(s): _____

MDE Staff: _____

MDA Staff: _____

District Staff: _____

Other Participants: _____

Persons Interviewed: _____

Farm Name (if any): _____

Farm Address _____

GPS coordinates (entrance) Latitude: _____ Longitude: _____

Owner/Operator Information

Owner Name: _____

Operator(s): _____

Phone: _____ *home work cell fax na*

Phone: _____ *home work cell fax na*

Email Address: _____

Owner Address: _____

Operator Address: _____

Mailing Address: _____

Overview of Business Information

Farm Type (Primary): ☐ Dairy ☐ Beef ☐ Swine ☐ Layer ☐ Broilers ☐ Turkey

Animal Product: _____ Sold To: _____

Production Level (i.e. gals/day of milk): _____

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CAFO/MAFO/AFO Status

- ☐ Concentrated Animal Feeding Operation (CAFO)
☐ Maryland Animal Feeding Operation (MAFO)
☐ Animal Feeding Operation (AFO)
☐ Not Applicable

Is the farm in a preservation program? Yes No

Name: _____

Acres in program: _____ acres

Animal Inventory

Animal Type	Current No.	Weight	Animal Type	Current No.	Weight
Milking Cows			Beef Cattle		
Dry Cows			Swine		
Heifers >1 yr			Horses		
Heifers <1 yr			Mules		
Calves <2 mos			Broilers/Layers		
Bulls			Other		

Farm Management Documents and Plans

- ☐ Maryland General Discharge Permit Coverage (Permit No. _____)
- ☐ NOI/application submitted (Date _____)
- ☐ The farm has a gross income of \geq \$2,500 or eight or more animal units (8,000 lbs or more of live animal weight)
- ☐ The farm does not meet Maryland's NMP exemption requirements ⁷
- ☐ Nutrient Management Plan⁸
(Date _____, Author _____)
☐ Certified Nutrient Management Consultant
☐ Certified Farm Operator
☐ Other: _____
- ☐ NRCS Comprehensive Nutrient Management Plan
(Date _____, Author _____)
- ☐ Ag. E&S/NRCS Conservation Plan
(Date _____, Author _____)
- ☐ Other Farm Management Plan(s) _____

Notes: _____

⁷ If an operator is subject to [Chapter 07 Agricultural Operation Nutrient Management Plan Requirements] only because the operator earns \$2,500 or more from the occasional sale of agricultural products as a result of participating in a 4-H or other agricultural youth organization project, the operator is exempt if:

(1) Verification of active participation in the 4-H or agricultural youth organization activity is made available upon request to the Department; and

(2) The activity is conducted so the potential for nutrient loss or runoff is minimized.

⁸ NMPs developed before October 15, 2012 must be updated when they expire or if changes to the operation require modifications, whichever occurs first. Plans revised or updated after October 15, 2012 must be developed and implemented in accordance with the revised requirements outlined in *Maryland's Nutrient Management Manual*.

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Cropland/Pasture/Field Management

Own: Total _____ ac Crops: _____ ac Pasture: _____ ac
Production Area: _____ ac

Rented: Total _____ ac Crops: _____ ac Pasture: _____ ac
Rented From: _____

Crops Grown:	<input type="checkbox"/> Corn _____ ac	Receive manure? <i>Yes</i> <i>No</i>
	<input type="checkbox"/> Alfalfa _____ ac	Receive manure? <i>Yes</i> <i>No</i>
	<input type="checkbox"/> Soybean _____ ac	Receive manure? <i>Yes</i> <i>No</i>
	<input type="checkbox"/> Tobacco _____ ac	Receive manure? <i>Yes</i> <i>No</i>
	<input type="checkbox"/> Other(s) (_____) _____ ac	Receive manure? <i>Yes</i> <i>No</i>

Crop Rotation: _____

Regular Soils Tests: *Yes* *No* Each field tested once every ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 yrs

Date of last soil test: _____ Laboratory results available for onsite review: *Yes* *No*

Notes: _____

Nutrient Sources

Stored Manure (% , Gal, or T): Used On Site _____ Export _____

Yes *No* Import Manure?
Annual amount of imported manure: _____ gal/tons
Source of imported manure? _____

Yes *No* Inorganic Fertilizer used?
Type: _____
Amount used: _____

Yes *No* Biosolids used?
Source: _____
Amount used: _____

Yes *No* Irrigation used?

Notes: _____

Land Application of Nutrients and Chemical Fertilizers**Yes No** Is manure spread on pastures?

Pasture acres receiving manure: _____ acres

Yes No Manure, biosolids, and/or other organic nutrient sources is/are injected or incorporated into the soil within 48 hours of application.⁹**Yes No** Does the farm apply organic nutrients (except poultry litter) from March 1 through November 15?☐ Existing crop☐ Fall planted crop☐ Field that will be cropped in the spring**Yes No** University of Maryland recommendations are followed for application of organic nutrients.Fall Practices (September 1 through November 15)**Yes No** The farm applies chemical fertilizer in fall.

Product or composition: _____

Yes No University of Maryland recommendations are followed for fall application of chemical fertilizer.**Yes No** Does fall application of N occur on small grains?

Small grain type(s): _____

Yes No Fall nitrate test levels are greater than 10 ppm for wheat or 15 ppm for barley?¹⁰

Field Identifier	Soil Nitrate Test Level	Sample Collection Date
	_____ ppm	____ / ____ /20
	_____ ppm	____ / ____ /20
	_____ ppm	____ / ____ /20
	_____ ppm	____ / ____ /20

Yes No Are cover crops planted when organic nutrient sources are applied in the fall?¹¹

Notes: _____

⁹ Beginning Spring 2013, manure, biosolids, and other organic nutrient sources must be injected or incorporated into the soil with 48 hours of application. Exceptions are made for spray irrigation on a growing crop, permanent pastures, hay production fields, and highly erodible fields.

¹⁰ Beginning Fall 2013, fall nitrogen application is prohibited on small grains if a fall nitrate test indicates levels greater than 10 parts per million (ppm) for wheat or 15 ppm for barley.

¹¹ Beginning Fall 2013, cover crops must be planted when organic nutrient sources are applied in the fall.

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Winter Practices (November 16 through March 1)

Yes No The farm spreads manure during the winter
If yes, when was the last time: _____
If yes, which crops receive manure: _____
If yes, which fields receive manure: _____

Yes No Winter application of organic nutrients occurs because of *inadequate* manure storage.
☐ Manure/waste is not stackable.
☐ Land application is the only reasonable option

Yes No The farm applies chemical fertilizer in winter.
Product or composition: _____
☐ Chemical fertilizer is applied for green up of perennial forage crops or small grains.

Best Management Practices

Yes No No-Till/Low Till
Implementation Level: _____ ac / %

Yes No Winter Cover Crop
Current year implementation level: _____ ac
Typical year implementation level: _____ ac
Type of cover crop: _____
Does cover crop receive manure? **Yes No**
Amount of manure applied to cover crops: _____ gal/tons

Yes No Stream Bank Fencing: (if applicable)
Implementation Level: _____ ft
☐ Stream banks are fenced on both sides of stream(s)

Yes No Vegetated Stream Buffers: (if applicable)
Implementation Level: _____ ft
Average width of buffer: _____ ft
Minimum width of buffer: _____ ft Maximum width of buffer: _____ ft

Yes No Is the operator familiar with the setback requirements that are effective beginning January 2014?¹²

Yes No Buildings/structures around the barnyard have operational gutters and downspouts?

Notes: _____

¹² Beginning January 1, 2014:

A) farmers are required to establish a 35-foot setback for fertilizer applications adjacent to surface waters and streams. The setback is reduced to 10 feet when directed application methods are used such as directed spray or injection, which reduce the potential for nutrient losses. No crop plants may be grown on the 10 foot setback area with the exception of pasture and hay. Crop plants may be grown on the remaining 25 foot setback, but may not be fertilized unless a directed application method is used.

B) Livestock access to streams and certain surface waters is restricted by a minimum 10 foot setback. Fencing is not specifically required to allow soil conservation district staff the flexibility to determine whether alternative BMPs such as watering facilities, stream crossings, pasture management techniques or vegetative exclusion would work as well as fencing in protecting water quality on a site-specific basis.

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Raw Materials Management

Type of feed produced by self: _____

Type of feed imported: _____

Type of feed storage: _____

Yes No Operator manages feed formulation to reduce nutrient content in manure

Yes No Is stored feed exposed to precipitation

Yes No Silage Leachate?

Yes No Is bedding exposed to precipitation?

Wastewater Management

Milkhouse wastewater directed to: _____

Mortality Management

Method of Disposal (select all that apply)	Routine Mortality	Catastrophic Mortality	Comments
Compost in compost shed	<input type="checkbox"/>	<input type="checkbox"/>	
Compost in manure shed	<input type="checkbox"/>	<input type="checkbox"/>	
Outdoor composting	<input type="checkbox"/>	<input type="checkbox"/>	
Burial	<input type="checkbox"/>	<input type="checkbox"/>	
Incineration	<input type="checkbox"/>	<input type="checkbox"/>	
Rendering	<input type="checkbox"/>	<input type="checkbox"/>	
Other (describe):	<input type="checkbox"/>	<input type="checkbox"/>	

Surface Water and Stormwater Management (use Site Maps to identify location)

Yes No Is surface water present? Location: _____

Yes No Are man-made ditches, flushing systems, or other similar man-made devices present?
Location: _____

Yes No Is stormwater managed throughout the AFO in a manner in which it does not come into
contact with any raw materials, products, or byproducts including manure, litter, feed, milk,
eggs or bedding?

Yes No Does water come into direct contact with the animals confined in the operation?

Notes: _____

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Manure Storage

Storage 1: _____ Date Built: _____ Dimensions: _____

Designed by: _____ Constructed by: _____

Did you use any government cost-share funding? *Yes No* Program: _____

Capacity: _____ gals _____ *months or days* Disposal Method: _____

Freeboard maintained (inches): _____ Lining: _____

Storage Condition: ☐ Good ☐ Needs Improvement ☐ Other _____

Manure Testing: ☐ Never ☐ Once every 1 2 3 4 5 years ☐ Not Routinely

Storage 2: _____ Date Built: _____ Dimensions: _____

Designed by: _____ Constructed by: _____

Did you use any government cost-share funding? *Yes No* Program: _____

Capacity: _____ gals _____ *months or days* Disposal Method: _____

Freeboard maintained (inches): _____ Lining: _____

Storage Condition: ☐ Good ☐ Needs Improvement ☐ Other _____

Manure Testing: ☐ Never ☐ Once every 1 2 3 4 5 years ☐ Not Routinely

Storage 3: _____ Date Built: _____ Dimensions: _____

Designed by: _____ Constructed by: _____

Did you use any government cost-share funding? *Yes No* Program: _____

Capacity: _____ gals _____ *months or days* Disposal Method: _____

Freeboard maintained (inches): _____ Lining: _____

Storage Condition: ☐ Good ☐ Needs Improvement ☐ Other _____

Manure Testing: ☐ Never ☐ Once every 1 2 3 4 5 years ☐ Not Routinely

Notes: _____

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Animal Type And Animal Confinement Area	Animal Confinement Area (Barn, Freestall Barn, Lot, Loafing Area, Parlor, Pasture)	Time Mgmt	Waste Generated in ACA	Storage /Treatment (Storage Pond, Lagoon, Tank, Stockpile, Manure Shed)
Milking Cows	Location:	____ hrs / day	<input type="checkbox"/> Manure	<input type="checkbox"/> No Storage
	Access To Stream <input type="checkbox"/> Yes <input type="checkbox"/> No	____ Days	<input type="checkbox"/> Bedding (Type _____)	<input type="checkbox"/> Flush Tank
	Covered <input type="checkbox"/> Yes <input type="checkbox"/> No	____ % (annual)		<input type="checkbox"/> Storage Location
	Impervious Surface <input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Land Application gal/T every _____ weeks
	Location:	____ hrs / day	<input type="checkbox"/> Manure	<input type="checkbox"/> No Storage
	Access To Stream <input type="checkbox"/> Yes <input type="checkbox"/> No	____ Days	<input type="checkbox"/> Bedding (Type _____)	<input type="checkbox"/> Flush Tank
	Covered <input type="checkbox"/> Yes <input type="checkbox"/> No	____ % (annual)		<input type="checkbox"/> Storage Location
	Impervious Surface <input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Land Application gal/T every _____ weeks
	Location:	____ hrs / day	<input type="checkbox"/> Manure	<input type="checkbox"/> No Storage
	Access To Stream <input type="checkbox"/> Yes <input type="checkbox"/> No	____ Days	<input type="checkbox"/> Bedding (Type _____)	<input type="checkbox"/> Flush Tank
	Covered <input type="checkbox"/> Yes <input type="checkbox"/> No	____ % (annual)		<input type="checkbox"/> Storage Location
	Impervious Surface <input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Land Application gal/T every _____ weeks
	Location:	____ hrs / day	<input type="checkbox"/> Manure	<input type="checkbox"/> No Storage
	Access To Stream <input type="checkbox"/> Yes <input type="checkbox"/> No	____ days	<input type="checkbox"/> Bedding (Type _____)	<input type="checkbox"/> Flush Tank
	Covered <input type="checkbox"/> Yes <input type="checkbox"/> No	____ % (annual)		<input type="checkbox"/> Storage Location
	Impervious Surface <input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Land Application gal/T every _____ weeks

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Animal Type And Animal Confinement Area	Animal Confinement Area (Barn, Freestall Barn, Lot, Loafing Area, Parlor, Pasture)	Time Mgmt	Waste Generated in ACA	Storage /Treatment (Storage Pond, Lagoon, Tank, Stockpile, Manure Shed)
Milking Cows	Location:	____ hrs / day	<input type="checkbox"/> Manure	<input type="checkbox"/> No Storage
	Access To Stream <input type="checkbox"/> Yes <input type="checkbox"/> No	____ Days	<input type="checkbox"/> Bedding (Type _____)	<input type="checkbox"/> Flush Tank
	Covered <input type="checkbox"/> Yes <input type="checkbox"/> No	____ % (annual)		<input type="checkbox"/> Storage Location
	Impervious Surface <input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Land Application gal/T every _____ weeks
	Location:	____ hrs / day	<input type="checkbox"/> Manure	<input type="checkbox"/> No Storage
	Access To Stream <input type="checkbox"/> Yes <input type="checkbox"/> No	____ Days	<input type="checkbox"/> Bedding (Type _____)	<input type="checkbox"/> Flush Tank
	Covered <input type="checkbox"/> Yes <input type="checkbox"/> No	____ % (annual)		<input type="checkbox"/> Storage Location
	Impervious Surface <input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Land Application gal/T every _____ weeks
	Location:	____ hrs / day	<input type="checkbox"/> Manure	<input type="checkbox"/> No Storage
	Access To Stream <input type="checkbox"/> Yes <input type="checkbox"/> No	____ Days	<input type="checkbox"/> Bedding (Type _____)	<input type="checkbox"/> Flush Tank
	Covered <input type="checkbox"/> Yes <input type="checkbox"/> No	____ % (annual)		<input type="checkbox"/> Storage Location
	Impervious Surface <input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Land Application gal/T every _____ weeks
	Location:	____ hrs / day	<input type="checkbox"/> Manure	<input type="checkbox"/> No Storage
	Access To Stream <input type="checkbox"/> Yes <input type="checkbox"/> No	____ days	<input type="checkbox"/> Bedding (Type _____)	<input type="checkbox"/> Flush Tank
	Covered <input type="checkbox"/> Yes <input type="checkbox"/> No	____ % (annual)		<input type="checkbox"/> Storage Location
	Impervious Surface <input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Land Application gal/T every _____ weeks

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